6303 INSTALLATION MANUAL

Aprilaire®

Fresh Ideas for Indoor Air®

SAFETY INSTRUCTIONS

ZONED COMFORT CONTROL SYSTEM

Read this Installation Manual before beginning installation of the Aprilaire Zoned Comfort Control System. For questions call Research Products Corporation at (800) 334-6011.

WARNING

1. 120 Volts may cause serious injury from electrical shock. Sudden operation may cause serious injury from moving parts. Leave power disconnected until installation is complete.
2. Sharp edges may cause serious injury from cuts. Use care when making duct openings and handling ductwork.
3. The Aprilaire Zoned Comfort Control System is designed for indoor use only. Do not expose any component of the zone control system to moisture. Do not mount any Aprilaire Zoned Comfort Control equipment where it may be accessible to children.

CAUTION

1. Installation must be done in accordance with all applicable codes.
2. Installer should touch a grounded metal object before handling the Aprilaire control panel to avoid potential loss of internal computer programs due to static discharge.
3. A zoned comfort control system may not control temperature properly unless the heating and cooling system is *properly sized and balanced.*
4. Insufficient air flow or excessive temperatures through the heating and cooling system could result in equipment damage. Refer to the manufacturer's recommendations for minimum safe airflow and temperature requirements.
5. Excessive pressure across a bypass evaporative type humidifier may cause high air velocity in the humidifier, resulting in water being blown into the ductwork. Refer to Design Guide for humidifier installation instructions.
6. Install an outdoor thermostat to prevent non-seasonal equipment starts if using auto changeover thermostats.
7. Do not mount the control panel on any part of the heating/cooling equipment or ductwork.
8. Do not install control panel where temperatures exceed 158°F (70°C).

INSTALLATION

CAUTION: Installer must touch a grounded metal object before handling the Aprilaire Zoned Comfort Control panel to avoid potential loss of programs due to static discharge.

1. MOUNT THE CONTROL PANEL

Four holes are provided on the back of the unit for mounting. **(See Figure 1)**

- Mount indoors using #8 or #10 screws (field supplied).
- Mount in location where the temperature will not exceed 158°F and will not drop below freezing (32°F).
- Do not mount on foundation walls, or on the HVAC equipment or ductwork. These locations can cause the enclosure to become cooler than the surrounding air, which can cause moisture to condense on the enclosure.

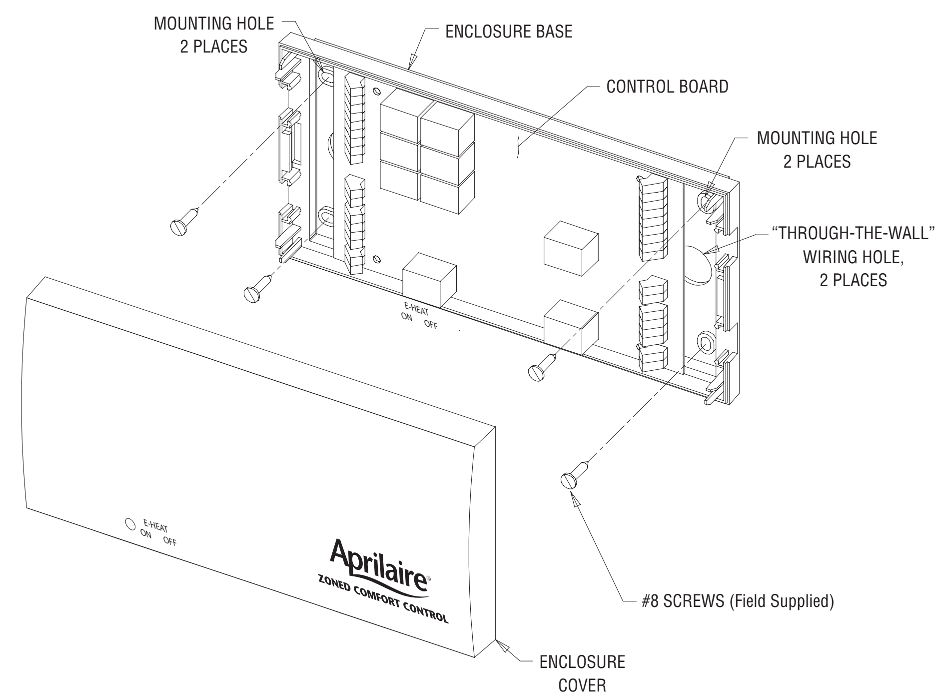


FIGURE 1

2. MOUNT THE 8052 PLENUM TEMPERATURE SENSOR (provided)

IMPORTANT: Do not mount the sensor in direct line-of-sight of the heat exchanger, cooling coils, or UV lights as they may cause the sensor to report false temperature readings.

- Locate the sensor in the supply trunk, after the heat exchanger and cooling coils and before the zone dampers (shaded areas). **(See Figure 2)**
- Mount the 8052 Sensor according to Installation Instructions provided with the sensor.
- Wire the 8052 Sensor to the Plenum Sensor terminals on the zoned comfort control panel before power is applied to control panel.
- Measure the resistance across the Plenum Sensor terminals (before power is applied to the panel) and confirm that it roughly corresponds to the ambient temperature values listed in the table below.

Ambient Temperature (°F)	Resistance (kΩ)
30	7.8
40	7.2
50	6.6
60	6.0
70	5.4
80	4.8
90	4.2
100	3.6

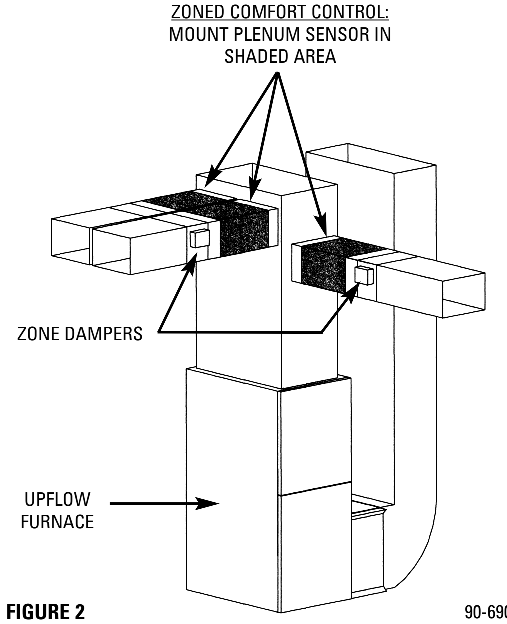


FIGURE 2

- **NOTE:** In order for the control panel to recognize a sensor, it must be wired to the panel before power is applied.

3. PROVIDE CONTROL SYSTEM POWER

Install a transformer, separate from the transformer provided for the HVAC equipment, to provide power for the control panel, thermostats and dampers. The size of the transformer depends on the greatest number of dampers that will be energized at any given time. If more than 6 dampers could be powered at one time, install dedicated damper transformers and a Model 8028 Damper Power Distribution Panel. Use the table below to size the added transformer(s). Aprilaire Flexible Link Dampers require 12 VA per damper. Multiply the number of dampers by 12 and select a transformer that meets or exceeds this value.
The table below illustrates.

Highest Number of Powered Dampers	VA Required	Select Transformer
3 or Less	36 VA or less	40 VA
4	48 VA	50 VA
5	60 VA	75 VA
6	72 VA	75 VA
7 or More	No. of Dampers* 12	75 VA + 40 VA / 3 Dampers

4. SET UP THE CONTROL PANEL FOR THE APPLICATION

- **Z1 HC/Z1 HP** is set according to the type of thermostat installed in Zone 1. If a heat/cool thermostat is used in Zone 1, place the pin jumper block on the left two pins (Z1 HC). While set as Z1 HC, emergency heat can only be controlled with the on board E-HEAT switch. If a heat pump thermostat is used in Zone 1, place the pin jumper block on the right two pins (Z1 HP). Using a heat pump thermostat in Zone 1 allows for emergency heat control from the Zone 1 thermostat.
- **GAS/ELECTRIC** refers to the auxiliary heat source. If gas (or propane or oil) heat is to be used, place the pin jumper block on the left two pins (GAS). This will allow the auxiliary heating equipment to control the fan operation through the use of a plenum switch. If electric heat is to be used, place the pin jumper block on the right two pins (ELECTRIC).
- **PURGE/NO PURGE** determines whether the zone control panel or the equipment will control the fan purge. If set to PURGE, pin jumper block on left two pins, the G terminal and any energized damper terminals will remain energized for a one-minute purge delay following the completion of a cool call, regular heat call or an electric auxiliary heat call. If set to NO PURGE, pin jumper block on right two pins, the G terminal will de-energize immediately and any energized damper will remain energized for 3.5 minutes following the completion of a call. The NO PURGE setting is designed for use with systems where the equipment has a built-in fan purge.
- **HT-160/120:** If using a plenum temperature sensor, this jumper controls the temperature at which the heating equipment will cut out to prevent overheating. Set the high limit temperature that is appropriate for the equipment being used. For a high limit temperature of 160°F, place the pin jumper block on the left two pins (HT-160). For a high limit temperature of 120°F, place the pin jumper block to the right two pins (120).
- **CL-45/40:** If using a plenum temperature sensor, this jumper controls the temperature at which the cooling equipment will cut out to prevent freezing the indoor coil. For a low limit temperature of 45°F, place the pin jumper block on the left two pins (CL-45). For a low limit temperature of 40°F, place the pin jumper block to the right two pins (40).

5.WIRE THE SYSTEM

Use standard 18 or 20 gauge thermostat wire, color coded wherever possible to simplify troubleshooting. The wiring diagram and the THERMOSTAT SELECTION guide below are to be used to guide you through wiring the system.

6. THERMOSTAT SELECTION

Any single stage heating and cooling thermostat can be used in zones 1 through 3. Zone 1 (only) has the option of using a single stage heat pump thermostat with an O terminal. Each thermostat must be capable of being turned off either through subbase or as a function of the thermostat.

Thermostat Requirements		
Type: HEAT/COOL (Zones 1–3)	THERMOSTAT TERMINALS: **R** (24V-hot), **W** (1st Stage Heat), **Y** (1st Stage Cool), **G** (Fan) *See Note	RECOMMENDED THERMOSTATS: Aprilaire 8344, 8363, or 8570
Type: HEAT PUMP (Zone 1 Only)	THERMOSTAT TERMINALS: **R** (24V-hot), **O** (Reversing Valve-cool), **W** (Auxiliary Heat), **Y** (Compressor), **G** (Fan) *See Note	RECOMMENDED THERMOSTATS: Aprilaire 8346, 8365, or 8570

*Note: The C terminal (24V-common) in each zone of the control panel can be used for 24 volt powered thermostats.
Terminal definitions (refer to thermostat manufacturer literature for matching terminals).

7. SEQUENCE OF OPERATION

Heat/Cool Thermostat Input Definitions: Heat = W, **Cool** =Y, **Fan** = G
Heat Pump Thermostat Input Definitions: Heat = Y, **Cool** = Y + O, **Fan** = G, **Aux. Heat** = Y + W**, Emergency Heat** = W

Fan Operation: A call for Fan from any zone will initiate the G equipment output terminal. The “NO” contact of the damper terminal for a zone not calling for Fan also energizes, while the “NC” contact de-energizes.

Heating Operation: When a zone makes a call for heat, the B, Y and G output terminal will energize. The “NO” contact of the damper terminal for any zone not calling for Heat also energizes, while the “NC” contact de-energizes. Following a 4-minute minimum on time, the Y terminal will de-energize when (1) all zones stop calling for heat, (2) the call has exceeded the heat/cool changeover time limit while a cooling call exists or (3) the call is interrupted by the high limit setting. Any energized damper terminals remain energized for a one-minute purge (if set to PURGE) or a 3.5 minute purge (if set to NO PURGE). Should the same call exist for 20 minutes, the W terminal will also energize (if set to ELECTRIC) or the W terminal will energize immediately after the Y and G terminals de-energize (if set to GAS). Following a 2-minute minimum on time (if set to GAS) or immediately (if set to ELECTRIC), the W terminal will de-energize at the end of the heat call. When the W terminal is de-energized, it has a 4 minute minimum off time if set to GAS or no minimum off time if set to ELECTRIC. When the Y terminal is de-energized, a minimum off time delay of 4 minutes must elapse before it can energize again. The B terminal remains energized until there is a call for cooling.

Cooling Operation: When a zone makes a call for Cooling, the O, Y and G terminals will energize. The “NO” contact of the damper terminals in any zone not calling for Cooling also energizes, while the “NC” contact de-energizes. Following a 4-minute minimum on time, the Y terminal de-energizes when (1) all zones stop calling for cooling, (2) the call has exceeded the heat/cool changeover time limit while a heat call exists or (3) the call is interrupted by the low limit setting. The G terminal and any energized damper terminals remain energized for a one-minute purge delay if set to PURGE. If set to NO PURGE, the G terminal de-energizes immediately and any energized damper terminals remain energized for a 3.5-minute purge delay. When the Y terminal is de-energized, a minimum off time of 4 minutes must elapse before it can be energized again. The O terminal remains energized until there is a call for heat.

Emergency Heat Operation: Thermostat control of Emergency Heat only exists in Zone 1 when a Heat Pump thermostat is installed. In this case, the first call for Emergency Heat sets the system to the Emergency Heat mode of operation. All subsequent calls for heat by other zones are recognized as Emergency Heat calls until Zone 1 calls for normal heat or cooling.

If Zone 1 is configured as a heat/cool thermostat, Emergency heat can only be initiated by turning the E-HEAT switch on the zone control panel to the ON position. When the E-HEAT switch is in the ON position, all calls for normal heating will be recognized as Emergency Heat calls. The system will remain in Emergency Heat mode until the E-HEAT switch is moved to the OFF position, at which point calls for heat will once again be answered with normal heating.

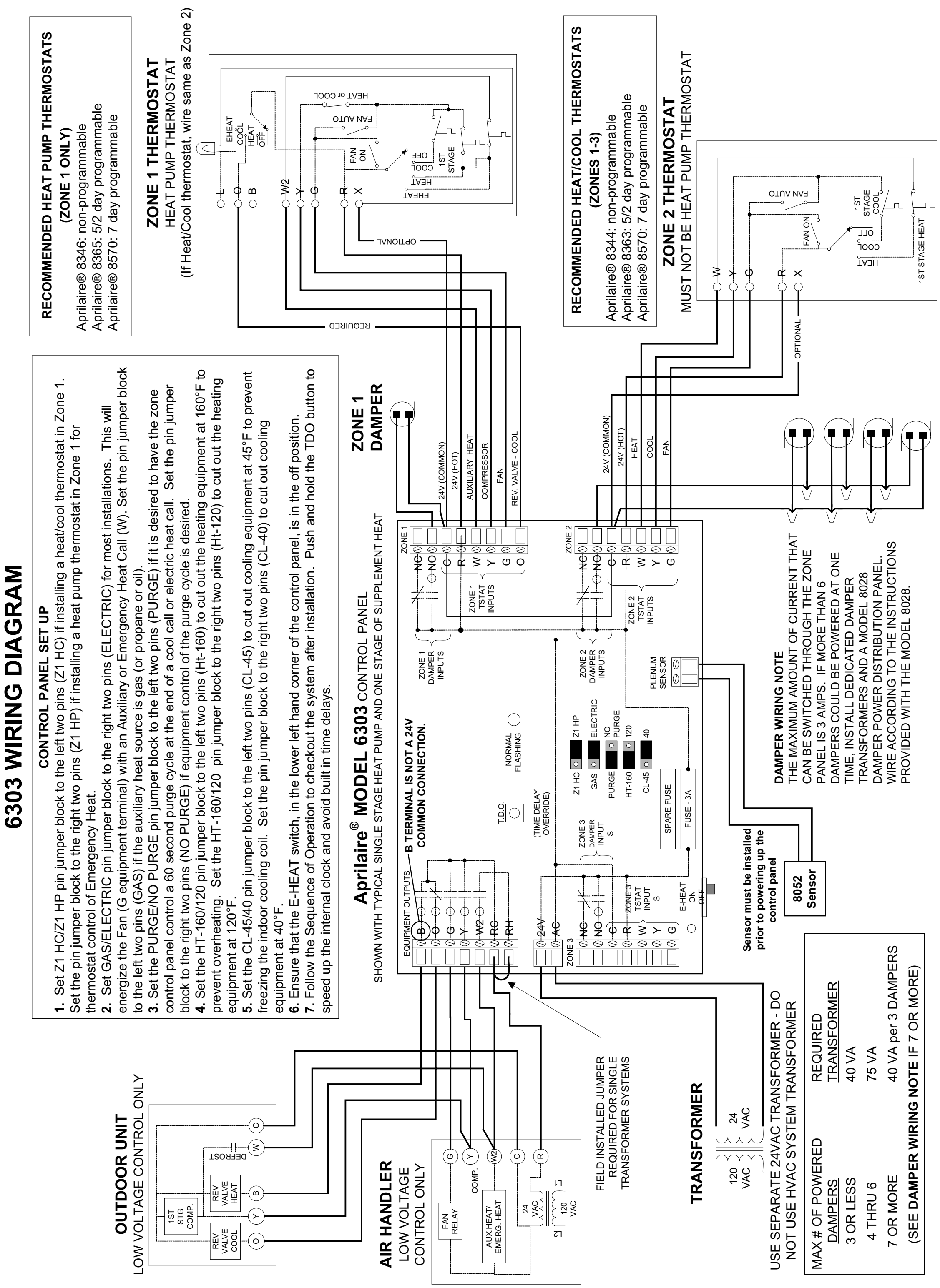
When a call for Emergency Heat is recognized, the Y terminal will de-energize (if energized) after a 4 minute minimum on time, after which the B and W terminals (and G terminal if set to ELECTRIC) will energize. Following a 2-minute minimum on time (if set to GAS) or immediately (if set to ELECTRIC), the W terminal will de-energize when (1) all zones stop calling for heat, (2) the call has exceeded the heat/cool changeover time limit while a cooling call exists or (3) the call is interrupted by the high limit setting. Any energized damper terminals remain energized for a one-minute purge (if set to PURGE) or a 3.5 minute purge (if set to NO PURGE). When the W terminal is de-energized, it has a 4 minute minimum off time if set to GAS or no minimum off time if set to ELECTRIC.

Heat/Cool Changeover: When a call for heat/cool exists and an opposing call is made from another zone, a changeover time limit of 20 minutes begins at the time that the opposing call is made. If the original call is not satisfied within that 20-minute time period, the call will be interrupted, turning the equipment off and allowing for the normal fan purge cycle and minimum equipment off time. The opposing call will then be answered. After 20 minutes, if the original call still exists, the opposing call will be interrupted and the original call can once again be recognized.

High/Low Limit Temperature: The high/low limit temperature settings are designed to prevent the heat exchanger from overheating or the cooling coil from freezing. An 8052 Sensor mounted in the supply duct senses the delivered air temperature and interrupts the heating/cooling equipment (depending on the Heat and Cool temperatures set on the control panel) before overheating/freezing occurs. When a heating/cooling call is interrupted by the high/low temperature limit, the zone control panel turns the equipment off and energizes the G terminal (if not already energized). Once the temperature drops/rises 10°F, the equipment is turned back on if the call for conditioning still exists.

TROUBLESHOOTING	
SYMPTOM	**CAUSE**
Normal Flashing LED not flashing	No power to control panel - check power wiring
No Heat call or Cool call	- TSTATS not operating properly. If Zone 1 is set up as a heat pump thermostat, it requires an O + Yfor cool call and Y for a heat call. - 4 minute minimum off time delay in effect - push TDO - Missing jumper between equipment RH&RC - required for single transformer systems - Equipment interrupt due to high/low temperature limit - Heat/Cool Changeover limit in effect and an opposing call is being answered in another zone
Won't stop calling	Minimum on time delay in effect (2 minutes for heat, 4 minutes for cool)
Heat calls being satisfied with Emergency Heat	- Heat Pump TSTAT installed in Zone 1: If Zone 1 is in Emergency Heat mode, all heat calls from other zones will be satisfied with Emergency Heat until Zone 1 makes a compressor call (normal heat or cool call). - Onboard E-HEAT switch is in the ON position and all calls for heat answered with Emergency Heat
No Emergency Heat Call	- Zone 1 W terminal not energized or energized with Y terminal - Onboard E-HEAT switch in the OFF position (Heat/Cool TSTATS installed in all zones)

6303 WIRING DIAGRAM



CONTROL PANEL SET UP

1. Set Z1 HC/Z1 HP pin jumper block to the left two pins (Z1 HC) if installing a heat/cool thermostat in Zone 1. Set the pin jumper block to the right two pins (Z1 HP) if installing a heat pump thermostat in Zone 1 for thermostat control of Emergency Heat.

2. Set GAS/ELECTRIC pin jumper block to the right two pins (ELECTRIC) for most installations. This will energize the Fan (G equipment terminal) with an Auxiliary or Emergency Heat Call (W). Set the pin jumper block to the left two pins (GAS) if the auxiliary heat source is gas (or propane or oil).

3. Set the PURGE/NO PURGE pin jumper block to the left two pins (PURGE) if it is desired to have the zone control panel control a 60 second purge cycle at the end of a cool call or electric heat call. Set the pin jumper block to the right two pins (NO PURGE) if equipment control of the purge cycle is desired.

4. Set the HT-160/120 pin jumper block to the left two pins (Ht-160) to cut out the heating equipment at 160°F to prevent overheating. Set the HT-160/120 pin jumper block to the right two pins (Ht-120) to cut out the heating equipment at 120°F.

5. Set the CL-45/40 pin jumper block to the left two pins (CL-45) to cut out cooling equipment at 45°F to prevent freezing the indoor cooling coil. Set the pin jumper block to the right two pins (CL-40) to cut out cooling equipment at 40°F.

6. Ensure that the E-HEAT switch, in the lower left hand corner of the control panel, is in the off position.

7. Follow the Sequence of Operation to checkout the system after installation. Push and hold the TDO button to speed up the internal clock and avoid built in time delays.

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